Foodborne viruses in Europe:

Web-based technologies for investigation of transnational outbreaks of viral gastroenteritis

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for:

The Foodborne Viruses in Europe Consortium

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Background

- Foodborne viral infections are increasingly recognised as a public health concern
- Norwalk-like viruses (NLV) are the most common cause of enteric disease
  - Large human reservoir
  - Stable outside the host
  - Small infectious dose (10-100 particles)
  - Cause outbreaks among all age groups
- Multiple genetic variants of NLV co-circulate in the community

Background II

BBC NEWS

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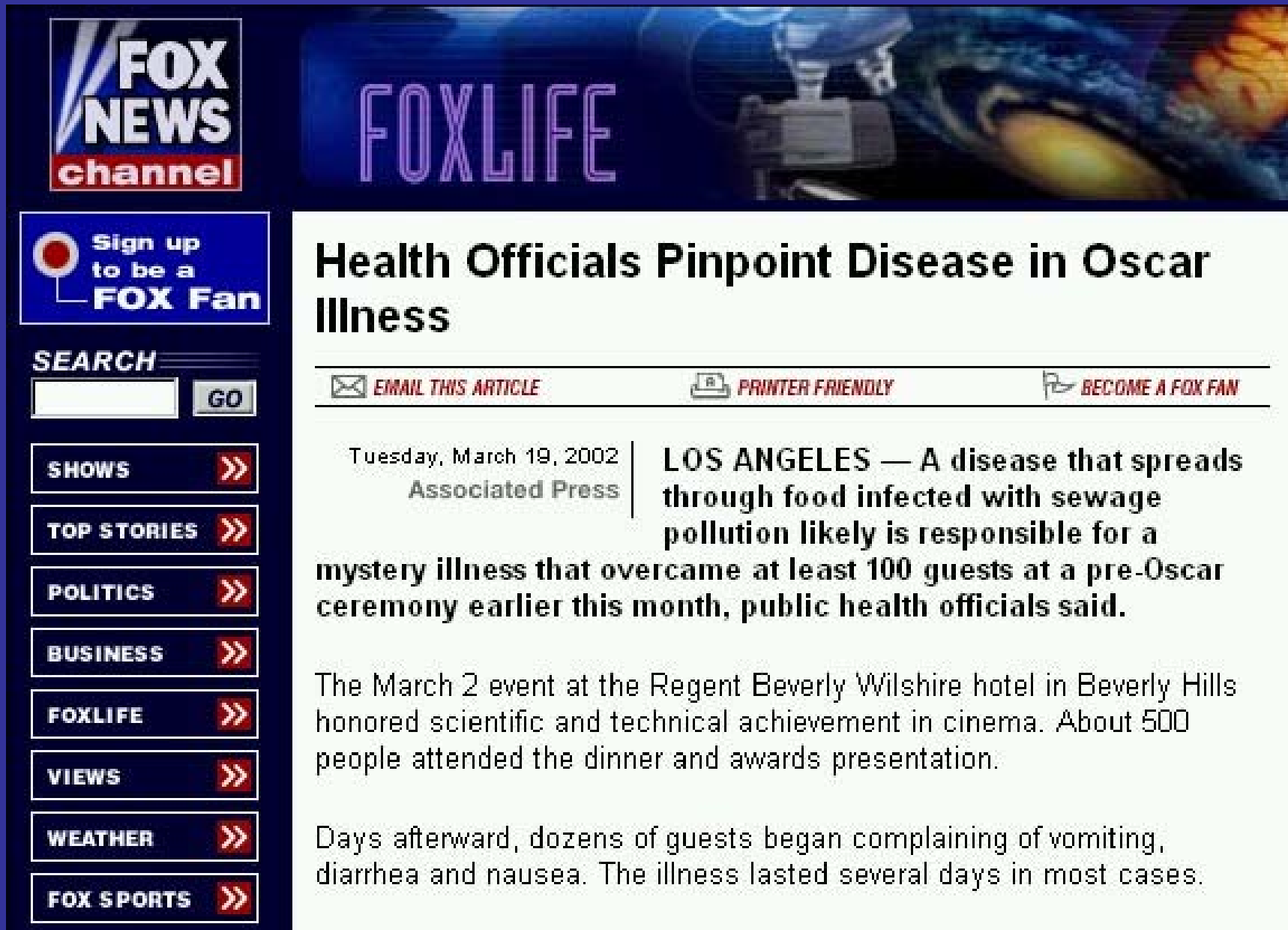
Tuesday, 22 January, 2002, 20:38 GMT

Virus leads to second hospital closure

The Victoria Infirmary remains closed

Background III



Burden of Norwalk-like virus gastroenteritis in US

Agents	Total Illnesses	Foodborne Illnesses	% of all foodborne illness
All Bacteria	5,204,934	4,175,565	30.2
All Parasites	2,541,316	357,190	2.6
Norwalk-like viruses	**23,000,000**	**9,200,000**	**66.6**

Source: Mead et al, EID, 2000

Foodborne Viruses in Europe

National Institute for Public Health and the Environment
Koopmans et al.

PHLS Colindale
Brown et al.

IFREMER
LeGuyader et al

University Dijon
Pothier et al

Central Public Health Institute, Madrid
Sanchez et al

University of Barcelona
Bosch et al

University of Helsinki
von Bonsdorff et al

Swedish Institute Infectious Disease Control; Svensson et al

Statens Serum institute
Bottiger et al

Robert Koch Institute
Schreier et al

Central Public Health Institute
Rome, Ruggeri et al

Objectives of the network

1) study the epidemiology of enteric viruses across Europe
2) determine high risk foods & transmission routes
3) identify novel strains at the onset and trace their spread.
4) investigate mechanisms of emergence of these novel strains

Harmonisation of European Surveillance

Epidemiological Data **Virological Data**

Harmonisation of methods

Development of web-accessible database

Harmonisation of European Surveillance

Epidemiological Data

Virological Data

Harmonisation of methods

Development of web-accessible database

Epidemiological Data I

- Harmonised clinical definitions
  - **CASE** of viral gastroenteritis
  - **OUTBREAK** of viral gastroenteritis
- Standard Outbreak Questionnaire
  - Etiology
  - Transmission
  - Setting
  - Case Information
  - Diagnostic Results
  - Food Vehicles

Epidemiological Data II

- **Web-Based outbreak report form**
- Active Server Pages technology
- Microsoft Access Database

http://www.eufoodborneviruses.net

Viral Gastroenteritis Outbreak Report Form

*Fields with a * must be entered*

Reporting Institute : Please select *

Outbreak Reference: * (your unique reference number)

Be sure to retain you outbreak reference. You will need it to update the record.

Reporter's Name: * (First Last)

Today's date: * dd/mm/yyyy

submit ONLY virological data

Transmission

Mode of transmission:

Please select one

If foodborne, "PREPARED" takes precedence over "SERVED".
If person-to-person "SERVED" takes precedence over "PREPARED".

Place where transmission of infection occurred:

Please select one

Was the outbreak the result of a point source exposure?
(e.g. a function?)

Viral Gastroenteritis Outbreak UPDATE Form

Reporting Institute : NL-National Institute for Public Health and the Environment *

Outbreak Number: EP2002040 * (your unique reference number)

Reporter's Name: Yvonne van Duynhoven * (First Last)

Today's date: 14/03/2002 * dd/mm/yyyy

Transmission

If foodborne, "PREPARED" takes precedence over "SERVED".
If person-to-person "SERVED" takes precedence over "PREPARED".

Mode of transmission:
PERSON TO PERSON

if "other", specify

Place where transmission of infection occurred:
Residential institution

Specify:

Was the outbreak the result of a point source exposure?(e.g. at a function?)
No

Viral Gastroenteritis Outbreak Search Page

Search by reporting institute:

Please select Search

Search by mode of transmission:

Please select one Search

Search by setting:

Please select one Search

Institute	Outbreak Reference	Reporter Name	Report Date	Organism	Mode of transmission	Setting	First date of onset	Chatacterisation data entered?
GB-Public Health Laboratory Service	020080	Celia Penman	18/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	23/01/2002	No
NL-National Institute for Public Health and the Environment	EP2002040	Yvonne van Duynhoven	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	08/01/2002	Yes
GB-Public Health Laboratory Service	020070	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	04/01/2002	No
GB-Public Health Laboratory Service	020069	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	03/11/2001	No
GB-Public Health Laboratory Service	020073	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Hotel/Guest House	25/12/2001	No
GB-Public Health Laboratory Service	020072	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	16/01/2002	No
GB-Public Health Laboratory Service	020031	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	07/01/2002	No
GB-Public Health Laboratory Service	020023	Celia Penman	14/03/2002	Rotavirus	PERSON TO PERSON	Residential institution	13/01/2002	No
GB-Public Health Laboratory Service	020012	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Residential institution	25/12/2001	No
GB-Public Health Laboratory Service	010587	Celia Penman	14/03/2002	Norwalk-like virus	PERSON TO PERSON	Hospital	30/11/2001	No

Click here to return to main page.

Short Outbreak report

Reporting Institute	**NL-National Institute for Public Health and the Environment**
Outbreak reference	**EP2002040**
Reporter's name	**Yvonne van Duynhoven**
Report date	**14/03/2002**

Mode of transmission/ setting

Mode of transmission	PERSON TO PERSON
Setting of outbreak	Residential institution
Details of setting	nursing home
Was the outbreak the result of a point source exposure?	No
Date of point source exposure	

Aetiology

Was the organism identified?	Yes
Organism name:	Norwalk-like virus

Case information

Harmonisation of European Surveillance

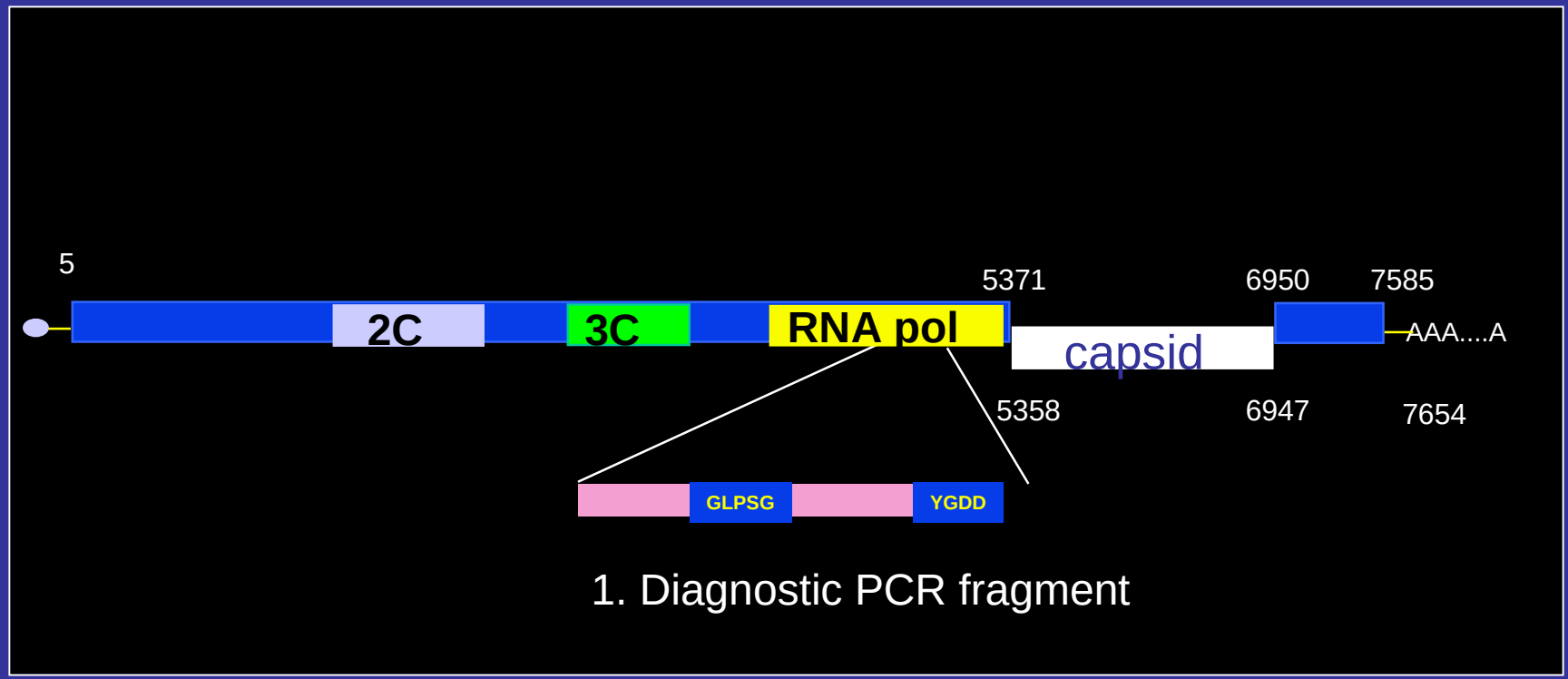
Epidemiological Data

Virological Data

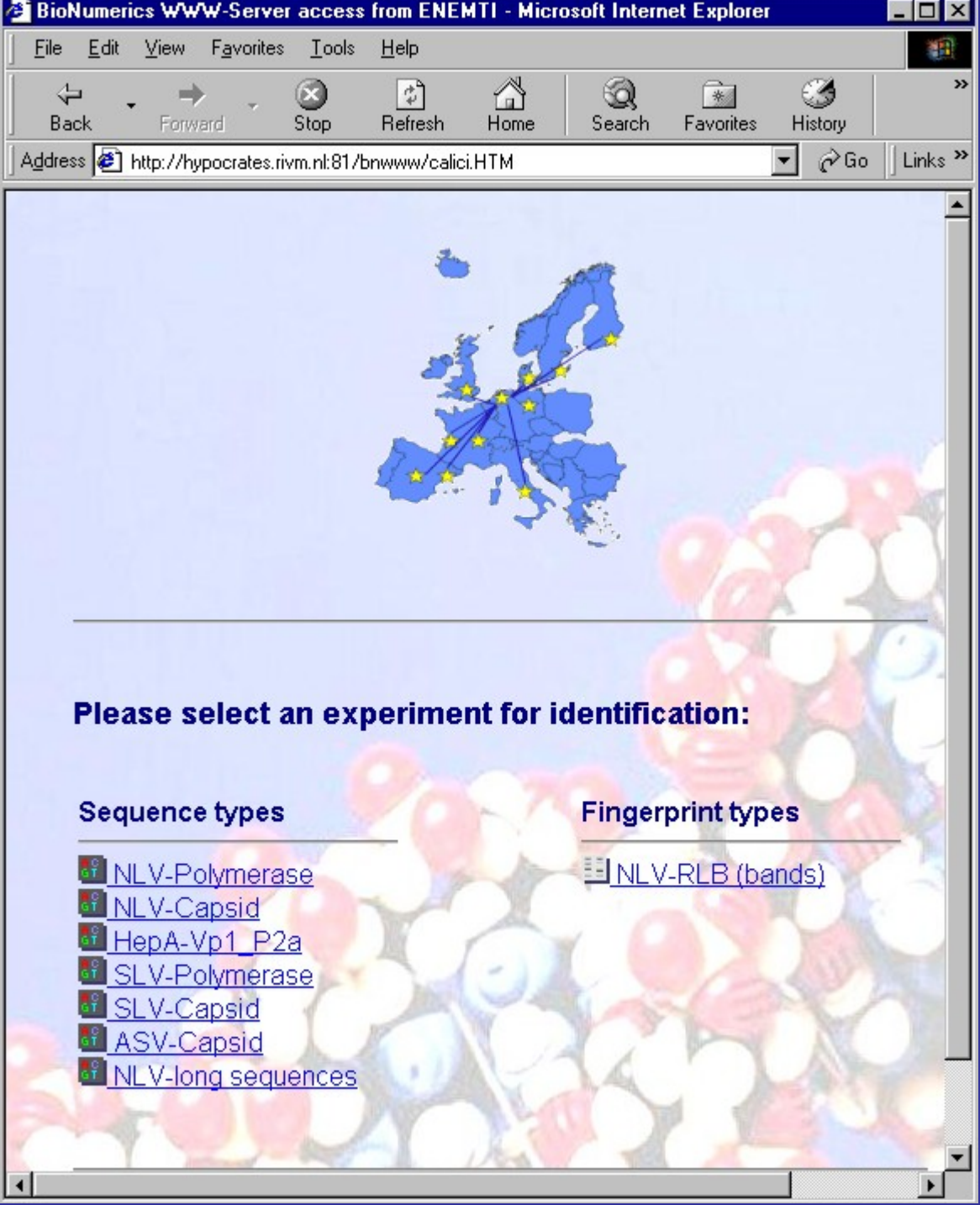
Harmonisation of methods

Development of web-accessible database

Virological Data: Sequencing of NLV



1. Diagnostic PCR fragment



Virological Data II

- Web-based genetic bank

Applied Maths,
Ghent, Belgium

Database

- Login: calici
- Password:
- Experiment: NLV-Polymerase

Identification

- Display up to: 10

Sequence data

Identify Reset

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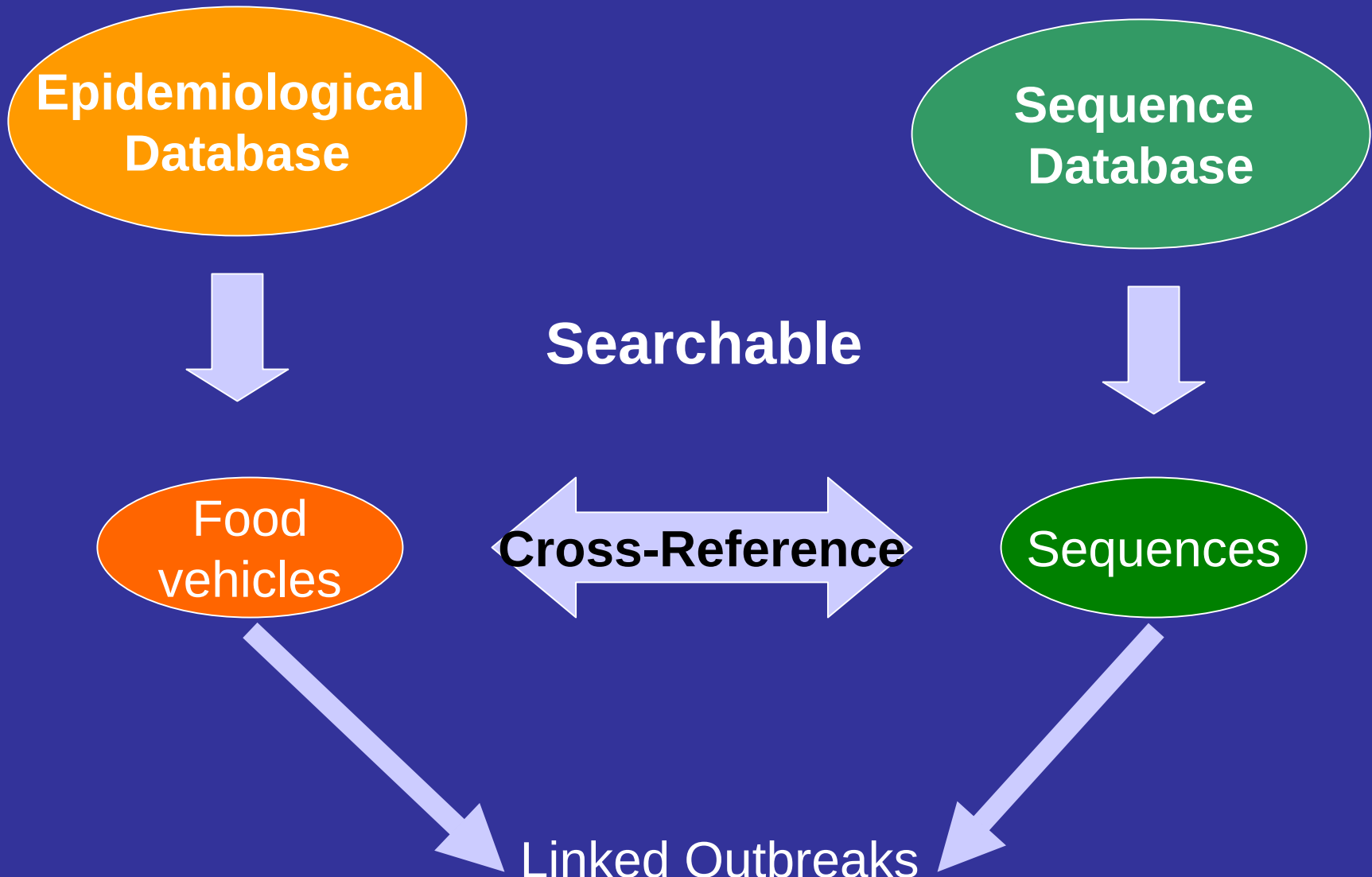
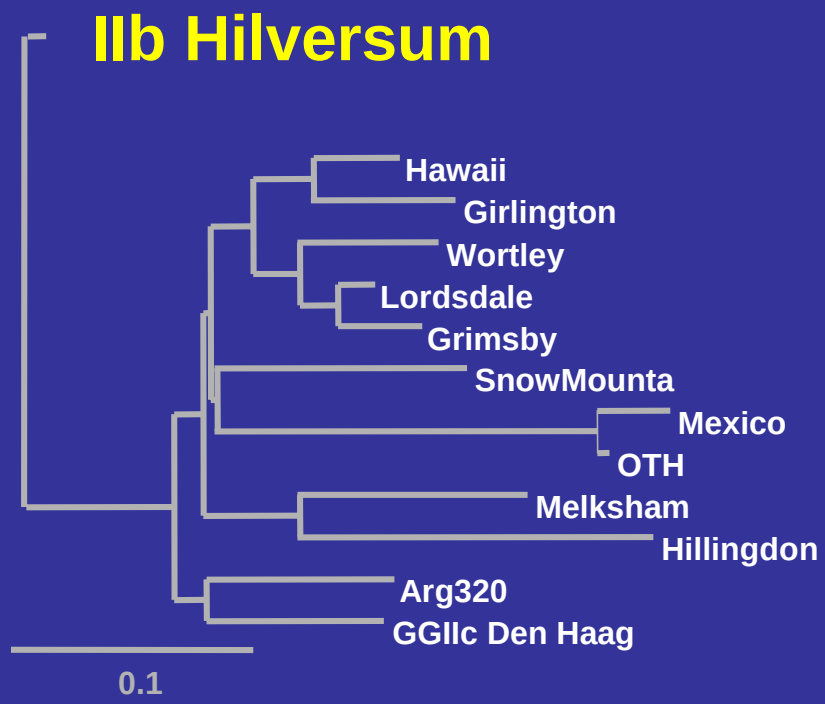
The databases are relational.



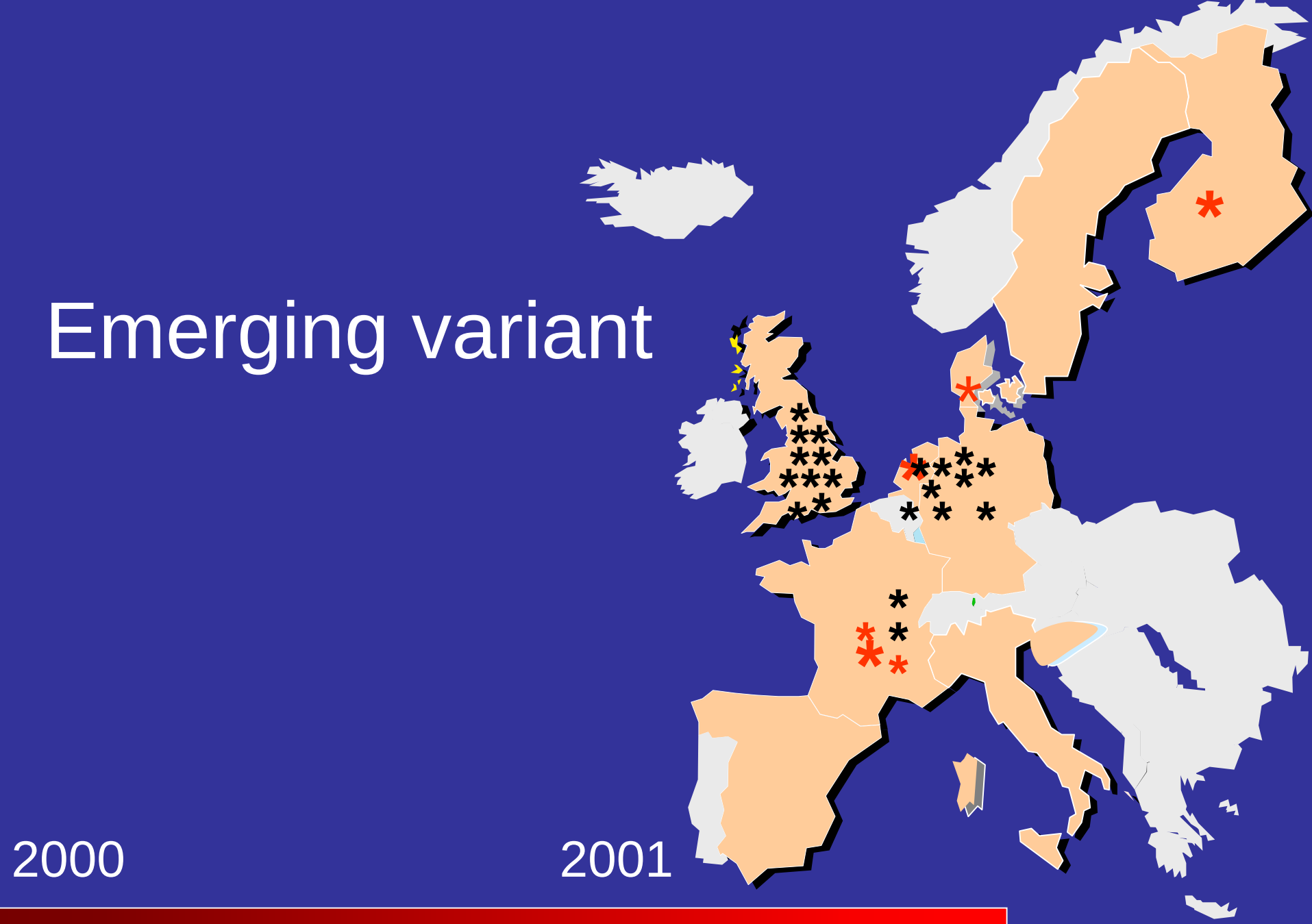
A group of linked outbreaks

Phylogenetic inference of emerging variant NLV IIb Hilversum:

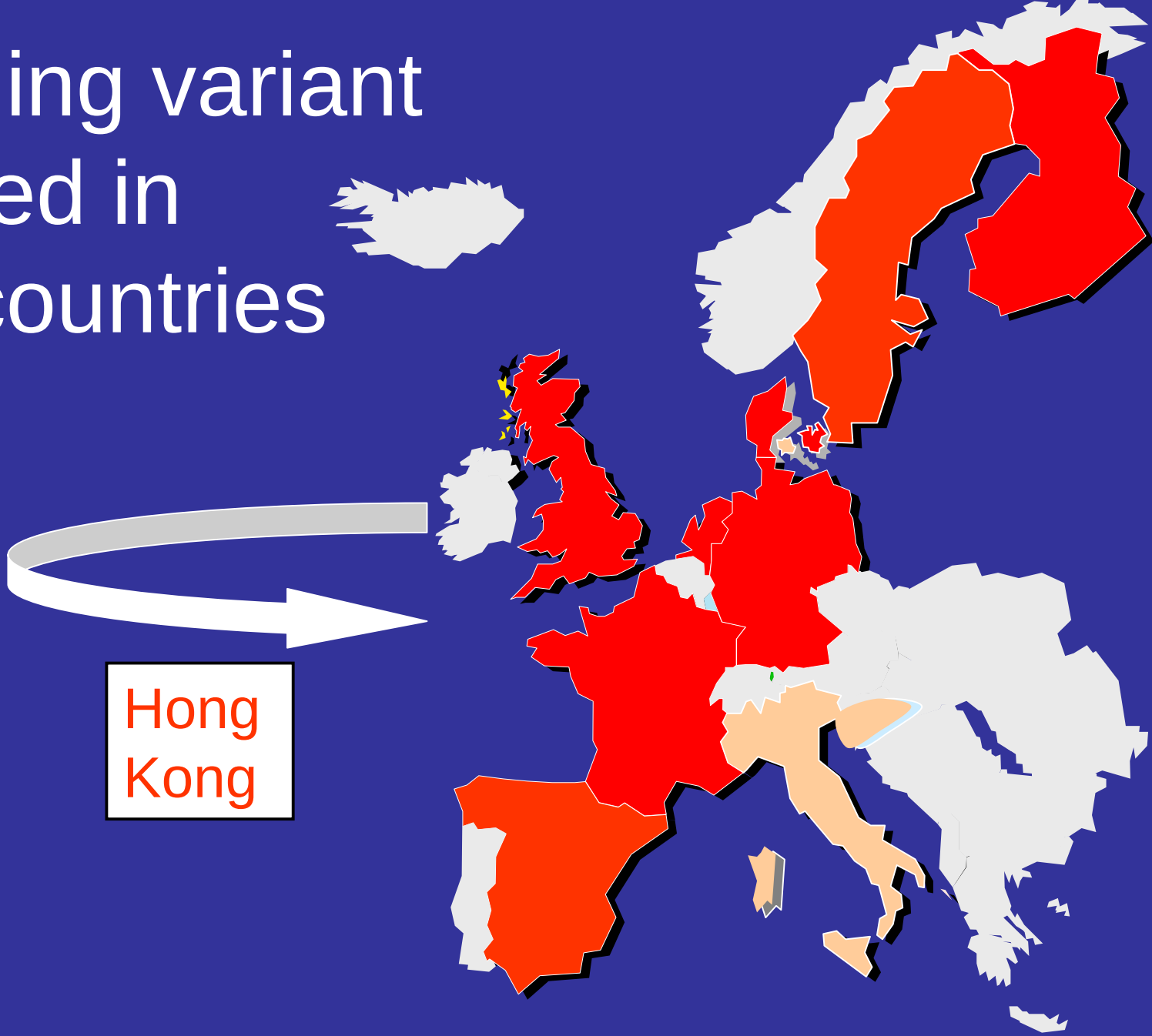
Polymerase gene



Emerging variant

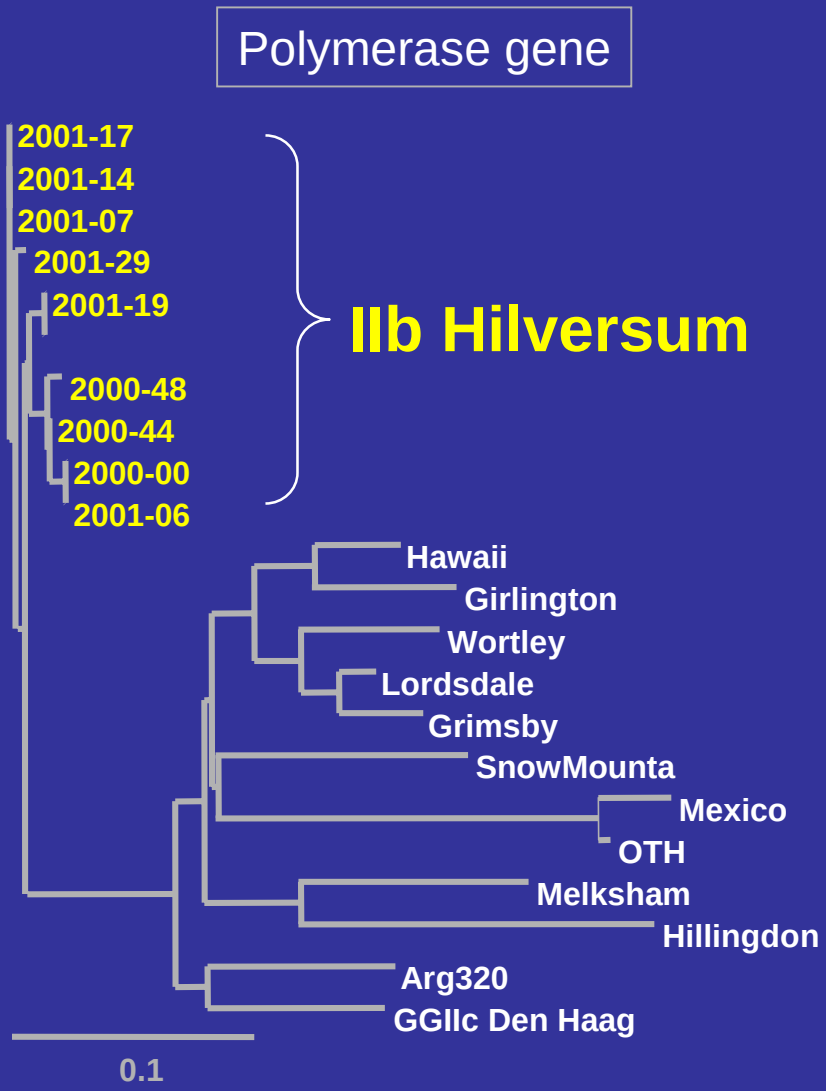


Emerging variant detected in eight countries



A group of linked outbreaks

Phylogenetic inference of emerging variant NLV IIb Hilversum:



Summary

- We have identified linked outbreaks on an international scale
- Transnational outbreaks may be common
  - Introduce new genetic variant to an area
- The Foodborne Viruses in Europe group has developed a model for the detection of transnational outbreaks
  - Web accessible password protected database
  - Open to all participants
  - Links can be recognised from epidemiological OR virological characteristics of outbreaks

Conclusions

- Recognition of international outbreaks relies on both molecular typing and epidemiological data
- Preliminary results from our network show the value of standardised international databases for the recognition of transnational outbreaks

www.eufoodborneviruses.net

Acknowledgements

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